DOCUMENT RESUME

ED 056 747 PS 005 033

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TITLE Curiosity and Exploratory Behavior in Disadvantaged Children: A Follow-Up Study.
INSTITUTION Temple Univ., Philadelphia, Pa.
PUB DATE Apr 71
NOTE 10p.; Paper presented at the meetings of the Society for Research in Child Development, Minneapolis, Minnesota, April, 1971

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Age Differences; *Behavior; Cognitive Development; *Concept Formation; *Curiosity; Elementary School Students; *Grade 1; Preschool Children; Self Concept; *Student Adjustment
IDENTIFIERS Exploratory Behavior

ABSTRACT

In a follow-up study of curiosity and exploratory behavior, subjects were 18 disadvantaged inner-city black children who had been observed at age four in their first year of a Head Start program, and who were now finishing first grade. Data were obtained from teachers, observations in the classrooms, and an individual session with each child. Each child was rated on a series of scales focussed on curiosity and other relevant dimensions. Findings indicate that the most curious and exploratory children at four years old are, for the most part, among the most vigorous, searching and adaptive at age six. An additional finding was that from the structure of the rooms, the conduct of events, and the nature of the curricula, it seemed evident that the schools the subjects attended did not generally assume that questioning and exploration were fundamental to learning. Some interactions were recorded that suggested active discouragement. Such situations have complex, long-term implications for the exercise and development of exploratory behavior, both in children who have been non-exploratory and in children who enter school with a basically exploratory stance. (Author/MK)

ED 056747

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CURIOSITY AND EXPLORATORY BEHAVIOR IN DISADVANTAGED CHILDREN: A FOLLOW-UP STUDY[1]

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In this paper I will present the highlights of a follow-up study on a small group of children studied intensively as four year olds in a Head Start program.[2] At the time of the follow-up, they were 6-7 years old and finishing first grade.

The original project had focussed on variations in curiosity and exploratory behavior within this group of preschool disadvantaged children. It started with the theoretical assumption that exploratory behavior is fundamental to the child's growth and development, and that variations in such behavior might well be associated with variations in other aspects of psychological growth.

The study had two objectives at that time: 1) to assess the consistency of exploratory behavior, and 2) to investigate the relationship between the extent of exploratory behavior and other aspects of emotional and cognitive development -- self image, concept formation, and expectations of coherence and support in the environment.

Subjects were 18, four year old, disadvantaged, inner city, black children - 9 boys and 9 girls - enrolled in their first year of a Head Start program. Data were gathered over a three month period and were obtained from preschool observations, teacher and observer rankings, and three individual sessions with each child.

There was significant agreement among the several measures of curiosity, suggesting a reasonable consistency, at that time, in a child's response to environmental possibilities, as seen along an approach-avoidance continuum. The data also suggested a pattern of relationships between curiosity and other variables. Children who were more exploratory

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[1]Presented at the meetings of the Society for Research in Child Development; Minneapolis, April 1971.

The follow-up study was supported by a grant-in-aid and a summer research award from Temple University

[2]A report of the original project will appear in Child Development, September 1971

in encounters with their surroundings were also more differentiated in their self-image, had more positive expectations of coherence and support from the environment, and showed greater conceptual mastery.

The data pointed to a "developmental high risk" group within this sample: six children who showed little curiosity or exploratory behavior; whose image of themselves appeared diffuse; who projected an environment characterized by sustained crisis and poorly defined, ineffective adults; and whose grasp of order and relationships in the object world seemed poor.

The follow-up study was conducted two years later, when the children were finishing first grade. At this time eleven children were in one school, though in four different classrooms; the remainder were in seven separate schools.

The follow-up study focussed on three questions:

1) Would there be consistency in the extent of curiosity and exploratory behavior across the two year span? Were the same children relatively high or low in expressed curiosity?

2) What had been the subsequent school adaptation of children previously identified as differing in curiosity and exploration? Did the earlier pattern predict later performance and behavior in school?

3) Did the relationship among variables suggested in the earlier study still obtain? That is, would there still be a pattern of relationships among higher curiosity, more developed concept formation, more positive expectations of people and events, and a more coherent self-image?

As a corollary of these questions, it was also a purpose of the follow-up to trace the development of the "high risk" children on the one hand, and the most sturdy and exploratory of the children on the other.

Data were obtained from teachers, observations in the classrooms, and an individual session with each child.

The teacher of each child was interviewed about his learning and classroom functioning, and rated him on a series of scales focussed on curiosity and other relevant dimensions. Each child was also observed for a morning in his classroom, and then rated on these same variables by the observer.

The individual session included the following techniques:

Object Curiosity task
Three concept formation tasks: Classification Test (Educational Testing Service); Conservation task; Similarities test (WPSSI)
Three techniques to provide self-concept measures: Drawing; Interview; Mirror games.

Dilemma Situations -- a semi-structured technique which sets doll figures into dilemma situations and asks the child to complete the stories (eg. The child is out for a walk and gets lost: What happens now? The child falls and hurts himself: What happens now? The child is in the classroom working on letters and numbers; it's hard and he doesn't understand it: what happens now?) This technique was used to provide data on the child's perception of the support and effectiveness of adults, his expectations of dilemma resolution, and his perception of the coping strength of child figures.

Most of these techniques were repeated or upgraded versions of those used in the 4 year old study.

Results

1) The consistency of curiosity.

In general, the pattern of relationships suggests a stable attitude across time. (Table 1). Correlations are not extremely high but in most cases are statistically significant and indicative of some stable pattern. Those children who were more active in their explorations as 4 year olds are still, by and large, the more exploratory and vigorous children in the school setting, as the observer sees them and as their teachers rate them against a descriptive norm.[1] Object-Curiosity at age 6 is somewhat tangential in this pattern. It is not significantly related to most other measures, but it does show consistency across time from a parallel situation at age 4 (r. 48). There is, then, some stability, carried across time and into varied situations, in the relative vigor with which a child moves toward his environment to explore or question it.

These statements of correlation and consistency must be seen in context. Though children behaved in ways predictable from the earlier data, on a comparative basis, the actual incidence of observed curiosity, questioning, intellectual or physical exploration was low. Perhaps this is a commentary on the children; perhaps it was a partial function of limited observation time. Almost certainly, however, it was also a reflection of the inhospitable climate for such behavior in most of these first grade classrooms. From the structure of the rooms,

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[1]Not included on table: X2 of teacher rankings at age 4 and teacher ratings at age 6, divided at the medians, is significant at $P. < .02$

the conduct of events, and the nature of the curricula, it seemed evident that these schools did not generally make the assumption that questioning and exploration are fundamental to learning; the observer recorded some interactions that suggested active discouragement. Though the children may carry internally consistent attitudes within them, as they function in their early school environments, long term implications for their development probably hinge as much on the level of receptivity and encouragement in their school environments as on their own early propensities.

2) The relation between previous patterns of curiosity and subsequent adaptation in the classroom.

If we look at the primary judgment of adequate functioning, that of the teachers, the predictive value of the 4 year old data is mixed. (Table 2) Object-Curiosity at age 4, a laboratory situation, shows no relation to subsequent adaptation, and the combined curiosity score at 4 (all sources) is not significantly related. Exploratory behavior in the preschool classroom, taken by itself, does predict subsequent adaptation in first grade (r. 52). In general, 4 year old curiosity scores predict the current rating of curiosity better than the current rating of adaptation. The ratings of adaptation and effective functioning included the teacher's perception of the child's academic success, as well as the teacher's implicit standards for behavior, obedience, and so forth. The teachers' current ratings of curiosity and adaptation were significantly correlated (r. 60) but were not identical, and were differentially related to the past curiosity patterns.

Relationships between earlier curiosity patterns and the observer's perceptions of current adaptation were relatively high (Table 2). Though the teachers and observer showed significant agreement on ratings of both curiosity and adaptation (r. 59 in both cases), the observer tended to equate adaptation and curiosity more than the teachers (r. 94). In part, she had less cumulative information about learning effectiveness to go on; it is also likely, however, that she had a different implicit value system, weighing vigor, participation and approach patterns, rather than conformity, toward a judgment of comfortable adaptation and functioning effectiveness in the classroom.

3) The pattern of relationships between curiosity and other aspects of development.

There is a pattern of significant relationships between curiosity in the classroom setting, as rated by teachers and the observer, and the child's perception of adults and the environment, aspects of self-image, and school adptation. There is no reliable relationship with concept formation (Table 3).

Specifically, those children rated by teachers and the observer as more alert, questioning and exploratory in response to new experience, show certain other features as well. They tend to project more confidence in an ultimately manageable environment and in the dependability of effective, supportive, role-coherent adults -- as assessed through the stories they play out to resolve dilemmas of need, inadequacy, or threat. They also project stronger, more differentiated images of themselves. They describe more aspects of their interests, feelings and capacities in interview; show more differentiated affect in mirror games; and project child figures in the dilemma situations who cope actively with the situation themselves or mobilize others in their behalf. Only the drawings, included here among self-concept measures, show no relationship with curiosity measures. They may represent a different dimension of self-projection or, indeed, a larger intellectual component, since they have been scored by the Goodenough - Harris method. These more exploratory children tend to adapt better in the classroom, though there is no indication in the concept formation material that their thinking is more advanced. (The conservation measure is not included in the table since only three children were conservers.)

Those children rated non-exploratory by the teachers and observer are, according to these data, less apt to expect adult support or the positive resolution of their problems. They project an image of themselves that is sparsely differentiated and relatively passive -- children to whom things happen, rather than active copers. They are also seen, by and large, as less adequately adapted in their classrooms, though they are not necessarily less intellectually adequate.

The patterns of relationships at 6 generally bears out the pattern seen at age 4, both in substantive ways and in the fact that object-curiosity, measured in a lab situation, is a poor predictor of other dimensions of functioning. It is the exploratory, active stance of the child in the naturalistic classroom setting (with all the limitations of that measure) that best indicates or reflects his expectations of others, his self-image, and his general adaptation.

The major difference between the 4 and 6 year old data is the lack of relationship at 6 between curiosity and the measures of concept formation. While this relationship was not strong in the 4 year old data, there was some positive relationship, no longer seen, between exploratory behavior and concept formation. Aside from measurement problems, there is the obvious likelihood that, by the end of first grade, learning experiences in the different schools have become a powerful factor, combining with feedback from the child's own explorations to shape his grasp of conceptual relationships and his functioning on tests of concept formation.

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To consider briefly, now, the current pattern of the most and least exploratory of the four year olds:

The most exploratory children at 4 are, for the most part, among the most vigorous, differentiated and adapted at 6, seen by their teachers as functioning well in the classroom and learning adequately. If these relatively vigorous children seem somewhat constricted in their classrooms, that is a psychologist's comment and does not change the pragmatic fact that they are adapting effectively to the realities of their school environments.

The notable exception is Tara. One of the most exploratory children at 4, she is still exploratory, reactive to objects and new events, an energetic, coping child -- but she projects a perception of a tough and turbulent environment, with erratic and undependable adults, and her energies and curiosity are not focussed on the learning tasks of the school. The teacher rates her low in learning and only fair in adaptation; the school is mildly impatient with her. She serves as an example of two points, perhaps: first, that what is technically consistent in the child, such as an exploratory stance, may change in its implications as the child grows and the context changes; secondly, that the school had not found a way, apparently, to mobilize her energies and her strong curiosity toward learning. This is an educational task that might require both a less tightly programmed curriculum structure than prevailed in her school and some recognition and corrective for her combattive and distrustful expectations concerning adults.

Of the six children labelled "high risk" at age 4, five are still low in curiosity and three present a fully consistent high risk pattern at age 6: inhibited, unsure or distrustful of themselves and others, marginal in the classroom to the point of failure, with little learning and poor adaptation. The other three present some mixture, and two of these bear brief description:

Mary, a shy, passive, 4 year old, living in an amorphous, negative, unsatisfying world, as she projected it, and poorly developed in her ideas and concepts, showed a gratifying and rather remarkable change. At 6, she is uneven in her functioning, but more lively, mobilized and effective than we could possibly have predicted. Concept formation is still low, and she still projects an essentially troubled environment, where adults are apt to be punitive and unreliable. Now, however, the child figure is a coper, active and reasonably effective. The teacher sees Mary as above average in curiosity and the object-curiosity situation bears this out. She is rated as average in school adaptation, not outstanding but certainly not a failure. The observer sees her as somewhat passive but adequately comfortable in the classroom. Perhaps there is some clue to the change in the primacy and nature of Mary's relation to other children. She is a peer-oriented child. In her dilemma

stories, other children, not adults, become central agents of help and resolution (a rare feature at this age), and in the classroom she is observed in constant contact with other girls. For a child unsure of adults, the context of the peer culture may have offered an important source of strength as she grew older, facilitating other positive changes.

Rose was another "high risk" child at age 4. Ranking last on all measures of curiosity as a 4 year old, she still presents a non-exploratory pattern. She had been in two first grades, since her family moved during the year, and both teachers were interviewed. Both rated her very low on curiosity and the object-curiosity situation confirms this, since she made no approach to the object even with encouragement. She projects a passive, relatively undifferentiated self-image, and tells stories in which people are relatively kind but ineffective and unable to resolve crises for an essentially passive child. Yet Rose does her work in school. Concept formation is adequate and learning proceeds. One of her teachers is concerned about her; she feels she is fearful, constricted, and much in need of help. The other teacher, running a more programmed classroom, feels that Rose has done very well: she rates her high in adaptation and learning, as a reflection of the fact that she does her work, responds to directions, behaves well and causes no trouble. In most ways, Rose's pattern was consistent over time. Again, however, the meaning and evaluation of a pattern, even if internally consistent, is partly a function of the context. Rose's pattern was adequately adaptive in a programmed educational approach; she would have been an inadequate failure in an "open classroom" based on the exercise of child initiative and on the self-propelled exploration of materials.

In summary, three points:

1) There appear to be some consistent, internalized differences in the exploratory behavior of young children. In this small sample, at least, these consistancies carried across a two year time span, from age 4 to age 6, and were expressed in new situations.

2) Differences in curiosity and exploration are associated with other aspects of functioning at age 6, as they were at age 4. The pattern of associations is similar to that seen at age 4, though not identical. More exploratory and vigorous children tend to be more confident of the support and effectiveness of adults, more differentiated in their self-image and with a stronger sense of their own effectiveness. Teachers see them as more adapted and effective in the school environment. In these data, however, there is no association at age 6 between exploratory behavior and the level of concept formation.

3) The broadest perspective on continuity and change in behavior patterns over time probably requires an ecological, as well as statistical, point of view. It is probably of some importance that curiosity, the major variable of this study, was a minor variable in most of the schools, secondary certainly to formal achievement and compliant behavior. It sharpens the obvious point that children function in context, shaped and affected by the values, expectations, supports and pressures of their environment. Whatever their own basic attitudes, children are obviously affected by school environments that do not mobilize curiosity toward central goals, that accept its absence without concern, or that subtly discourage its expression. Such environments have complex, long term implications for the exercise and development of exploratory behavior, both in children who have been non-exploratory from early ages and in children who enter school with a basically exploratory stance.

Tables to accompany :

CURIOSITY AND EXPLORATORY BEHAVIOR IN DISADVANTAGED CHILDREN : A FOLLOW-UP STUDY[1]

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Table 1

Curiosity and Exploration: Intercorrelations among 6 year old and 4 year old Measures[a]

	Teacher Ratings (6)	Object Curiosity (6)	Classroom Observation Ratings (6)	Combined Score (4)	Object Curiosity (4)	Pre-School Obs. (4)
T. Ratings (6)						
Obj. Cur.(6)	.44[b]					
Class. Obs.(6)	.59**	--				
Combined (4)	.57*	--	.62**			
Obj. Cur.(4)	.48*	.48*	.62**	.71**		
Preschool Obs.(4)	.58*	--	.59**	.86**	.58*	

**p $\leq$ .01 *p $\leq$ .05

[a]N=18

[b]Correlations (r) of .40 and above reported in table.

Table 2

Relation between Preschool Curiosity Measures (Age 4) and Subsequent Adaptation in the Classroom (Age 6)

	Adaptation in the Classroom (Age 6): Teacher Ratings	Observer Ratings[a]
Combined Curiosity (4)	.40	.67**
Object Curiosity (4)	--	.55*
Preschool Obs. Curiosity (4)	.52*	.59**

[a]** p $\leq$ .01 * p $\leq$ .05
Correlation between teacher and observer ratings of adaptation: r.59

[1]Presented at the meeting of the Society for Research in Child Development, Minneapolis, Minn., April 1971.

Table 3

Relation between Curiosity and Exploration (Age 6) and Other Variables (Age 6)

	Curiosity and Exploration: Teacher Ratings	Object Curiosity	Classroom Observation Ratings
Perception of Adults and the Environment:			
Dilemma Resolution	.51*	.44[a]	--
Perception Adult Support and Effectiveness	.52**	--	.53*
Self-Image:			
Self-Differentiation (Interview)	.74**	--	.51*
Child Coping (Dilemma Sit.)	.75**	.49*	.50*
Affect Differentiation (Mirror Games)	.75**	--	.69**
Drawings	--	--	--
Concept Formation:			
Similarities (WPSSI)	--	--	.43
Classification (ETS)	--	--	.44
School Adaptation:			
Teacher Ratings	.60**	--	.62**
Observer Ratings	.51*	--	.94**

** $p < .01$ * $p < .05$

[a]Correlations (r) of .40 and above reported in table